

Application No. 10/711,403
Technology Center 1775
Amendment dated October 18, 2006
Reply to Office Action dated July 18, 2006

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REMARKS

In the Office Action, the Examiner reviewed claims 1-20 of the above-identified US Patent Application, with the result that all of the claims were rejected under 35 USC §103 as being obvious over U.S. Patent No. 5,891,584 to Coffinberry et al. (Coffinberry) in view of Japanese Patent No. 356030514A to Hikino et al. (Hikino) and EP 0304176 A2 to Priceman. In response, Applicants respectfully request reconsideration for the following reasons.

Independent claim 1 recites limitations similar in substance and scope to independent claim 9, which is the only other independent claim rejected under 35 USC §103. Claim 1 is reproduced below for the convenience of the Examiner.

Claim 1: A hydrocarbon fluid containment article through which a hydrocarbon fluid flows, the hydrocarbon fluid containment article comprising:

a wall having a first surface wetted by the hydrocarbon fluid and an oppositely-disposed second surface exposed to an environment at a temperature higher than the hydrocarbon fluid;

a first coating system defining the first surface of the wall, the first coating system comprising an outermost layer consisting essentially of platinum and a ceramic barrier layer between the outermost layer and the wall, the hydrocarbon fluid contacting and flowing across the outermost layer, the platinum of the outermost layer catalyzing the hydrocarbon fluid to form particulates of carbonaceous gum substances suspended within the hydrocarbon fluid, the ceramic barrier layer being sufficiently thick to inhibit interdiffusion between the outermost layer and the wall; and

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a second coating system on the second surface of the wall, the second coating system comprising an outermost layer of platinum and a ceramic barrier layer between the outermost layer and the wall, the outermost layer being exposed to the environment so as to reflect radiant energy into the environment. (Emphasis added.)

At [Para 26] of their specification, Applicants teach

hydrocarbon fluid that eventually becomes sufficiently hot to form carbonaceous gum deposits is catalyzed by the platinum layer 18 of the fluid-wetted surface to promote the rapid formation of gum substances. It is believed that the platinum layer 18 catalyzes the formation of carbonaceous gum substances in a hydrocarbon fluid to the extent that, in a flowing system, the gum substances grow too quickly to allow them to adhere to the wall 12. Instead, gum substances are found in the form of very fine particulate within the fluid. (Emphasis added.)

Therefore, Applicants' claims use the term "catalyzed" consistent with the ordinary meaning of the word, namely, to "cause or accelerate (a reaction) by acting as a catalyst" (Oxford University Press), which in this case is the catalyzation of a hydrocarbon fluid to form carbonaceous gum substances.

Under the rejection, the Examiner explained that Coffinberry teaches a hydrocarbon fluid containment article whose surface is provided with a diffusion barrier material (e.g., tantalum, silica, etc.), a catalytic material (zirconium oxide), or a combination of both. The Examiner acknowledged that

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"Coffinberry does not teach the catalytic material as being platinum," but then cited Hikino as disclosing:

fuel tar collecting on a surface coated with platinum may be removed when heated to 350°C for an hour (column 3, lines 40-50 of Coffinberry). Therefore, as Hikino clearly teaches platinum is an effective catalytic material useful for prevention of adhesion of fuel tar to a surface, it would have been obvious to one of ordinary skill in the art at the time of the claimed invention to use the platinum layer of Hikino as either the catalytic material or in association with the catalytic material of Coffinberry overlaying the diffusion barrier layer. (Emphasis added.)

However, Hikino does not teach that "platinum is an effective catalytic material useful for prevention of adhesion of fuel tar to a surface" as alleged by the Examiner. Instead, Hikino teaches "facilitating removal of tar accumulated [on a surface] by way of oxidative destruction of the same" (Hikino's Abstract; emphasis added). In other words, Hikino does not teach or suggest that a platinum layer can prevent adhesion of tar, carbonaceous gum substances, or any other material, but merely that "oxidative destruction" of tar can be achieved with a platinum layer. According to Coffinberry, "oxidative destruction" of tar with Hikino's platinum layer is only achieved by heating the platinum layer to 350°C for sixty minutes.

In view of the above, nothing in Hikino teaches or remotely suggests that Applicants' platinum layer on a "hydrocarbon fluid containment article

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through which a hydrocarbon fluid flows" would be capable of "catalyzing the hydrocarbon fluid to form particulates of carbonaceous gum substances suspended within the hydrocarbon fluid," which as taught by Applicants occurs because "the platinum layer 18 catalyzes the formation of carbonaceous gum substances in a hydrocarbon fluid to the extent that, in a flowing system, the gum substances grow too quickly to allow them to adhere to the wall 12."

Finally, because the formation of gum deposits catalyzed by Applicants' platinum layer starts at room temperature and peaks at 370°C (Coffinberry at column 1, lines 54-56), Hikino's teachings that a platinum layer can oxidatively destroy tar if heated to 350°C is not pertinent to Applicants' claim that a platinum layer catalyzes a hydrocarbon fluid to form carbonaceous gum substances. The temperature at which Hikino teaches platinum oxidatively destroys tar is within the temperature range at which Applicants teach platinum promotes the growth of gum substances. Coffinberry and Hikino teach that the two diametrically opposed mechanisms occur at the very same temperature. Therefore, from reading Coffinberry and Hikino, one could conclude that (1) peak formation of gum deposits and (2) oxidative destruction of tar in the presence of platinum simultaneously occur at 350°C, but would not have any reasonable expectation that platinum would have any effect on the formation of gum deposits, much less promote the formation of gum deposits, particularly

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over the range of about 105°C to about 345°C claimed by Applicants.

Priceman does not compensate for the deficiencies of the combined teachings of Coffinberry and Hikino, and therefore does not alter the above analysis.

For all of the above reasons, Applicants respectfully request withdrawal of the rejection of the claims under 35 USC §103(a), and favorable reconsideration of their patent application. Should the Examiner have any questions with respect to any matter now of record, Applicants' representative may be reached at (219) 462-4999.

Respectfully submitted,

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